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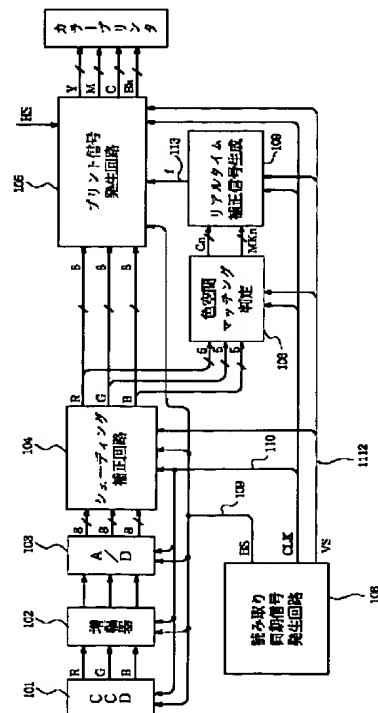
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(54)【発明の名称】 画像処理装置

(57) 【要約】

【目的】 入力画像と特定画像との、類似度に応じて、入力画像を処理する。

【構成】 入力画像と特定画像との類似度を判定する手段（１０６）を有する画像処理装置であって、前記入力画像の所定の領域毎に、特定画像との類似度を判定することを特徴とする。



## 【特許請求の範囲】

【請求項1】 入力画像と特定画像との類似度を判定する手段を有する画像処理装置であって、前記入力画像の所定の領域毎に、特定画像との類似度を判定することを特徴とする画像処理装置。

【請求項2】 前記判定手段は、入力画像と特定画像の色味の分布に応じて類似度を判定することを、特徴とする請求項1記載の画像処理装置。

【請求項3】 前記特定画像は、複数の画像であることを特徴とする請求項1記載の画像処理装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、特定画像の検出を、入力画像信号に基づいて行う画像処理装置に関するものである。

## 【0002】

【従来の技術】近年、複写機の発達に伴って、読み取った原稿の再現性が向上している。このため、紙幣などの偽造行為を防げるための技術が必要となる。その技術のひとつとして、色空間での特定原稿データを予め登録し、入力原画像データの分布が、色空間上で、特定原稿データの分布と、ほぼ同一になるか否かを判定し、特定原稿を判別する技術が本出願人により提案されている。

【0003】さらに詳しくは、入力原画像データのR（レッド）、G（グリーン）、B（ブルー）信号のR、G、B 3次元座標空間での分布と、特定原稿データのR、G、B 3次元座標空間での分布を比較し、合致している部分がある一定値以上になった場合、特定原稿の画像データが入力されていると判断するものである。

## 【0004】

【発明が解決しようとしている課題】しかしながら、上記技術によると、例えば図18に示すように、入力原稿の面積が大きく、かつ、特定原稿の色味に似た部分が、散在している場合、入力原稿を誤って特定原稿と誤判定するという問題がある。

【0005】これは、特定原稿に対して、判定対象となる入力原稿の面積が相対的に大きくなるにつれて顕著になる。

【0006】そこで、本発明は入力画像の所定の領域毎に、上記判定を行うことにより、誤判定を防止した画像処理装置を提供することを目的とする。

## 【0007】

【課題を解決するための手段及び作用】上記課題を解決するため、本発明の画像処理装置は、入力画像と特定画像との類似度を判定する手段を有する画像処理装置であって、前記入力画像の所定の領域毎に、特定画像との類似度を判定することを特徴とする。

## 【0008】

【実施例】以下、実施例で本発明の実施例を説明する。

【0009】（信号処理ブロック図）図1は、カラー画

像読み取り装置の信号処理ブロック図である。

【0010】同図において、101はCCDカラーセンサーであり、102は、アナログ増幅器であり、103はA/D変換器であり、104は、画像信号の読み取り位置による、明るさのばらつきを補正するシェーディング補正回路である。

【0011】106は読み取り画像データと例えば紙幣、有価証券等の特定原稿との3次元色空間での分布の類似度をリアルタイムで算出する色空間マッチング判定回路である。

【0012】シェーディング補正後のカラー信号を用いることにより、原稿の位置による、明るさ、色味の歪みが補正され、入力原稿の置かれる位置にかかわらず、色空間での類似度判定を正確に行うことができる。

【0013】カラー画像読み取り装置のシェーディング補正回路104は、公知の技術のため、ここでは詳述しない。

【0014】105は、プリント信号生成回路であり、入力カラー信号R（レッド）、G（グリーン）、B（ブルー）をY（イエロー）、M（マゼンダ）、C（シア）ン）、Bk（ブラック）信号に変換する回路である。また、リアルタイム補正信号f113により、プリント信号を変調する。

【0015】107は、リアルタイム補正信号f113を生成する回路である。

【0016】108は、読み取り同期信号IIS109、CLK110、VS112を生成する回路ブロックである。IIS109は、主走査区間信号であり、CLK110は画素読み取り基本クロック信号であり、VS112は、原稿読み取りの副走査方向有効領域を示す区間信号である。

【0017】（色空間マッチング判定回路ブロック106）図2は、色空間マッチング判定106を説明する図面である。

【0018】同図において、R201はシェーディング補正回路104からのR（レッド）信号8ビットのうちの上位5ビットのデータである。同様に、G202は5ビットのG（グリーン）信号であり、B203は5ビットのB（ブルー）信号である。

【0019】204は、複数種類の特定原稿の色味に関する情報が格納されているROM（リードオンリメモリ）である。アドレスA0～A14に前記R、G、B信号が入力され、入力R、G、B信号が、複数種類の特定原稿のそれぞれの色味に合致しているか否かを示す、判定信号が、データD0～D7に出力される。

【0020】ROM204のデータには図9に示す様に、特定原稿の色味に関する情報が格納されており、特定原稿の色味に合致する場合は1が、そうでない場合は0が、D0～D7のそれぞれに出力される。D0～D7は、第0から第7までの8種類の特定原稿に対応する。

【0021】図13は、ROM204に格納されている複数原稿の色味に関するデータと、ROM204のビット位置との関係を示した図である。これにより、入力された画素データに対してD<sub>0</sub>～D<sub>7</sub>から、8種類の異なった特定原稿の色味に関する判定情報が、並列に出力される。

【0022】220～227は、色味判定信号X<sub>0210</sub>～X<sub>7217</sub>の信号を用いて、図7、及び図8で示す平滑演算を行う回路である。

【0023】図7は平滑回路220～227の回路構成を示す回路ブロック図である。

【0024】同図において、701、702は乗算器、703は加算器、704はラッチ回路、705はコンパレータである。乗算器701、702、加算器703による入力データと前データとの加重平均により、下の図8に示す様な、連続性を加味した判定が可能となる。

【0025】図8は、入力X<sub>i</sub>と、平滑演算値Y<sub>i</sub>との関係を示す図である。入力X<sub>i</sub>の値が、1が連続すればY<sub>i</sub>の値が増大する。

【0026】これにより、入力R、G、B信号が、連続して特定原稿の色味に合致している場合に、信号230～237が1となり、ノイズ等の影響を受けることなく、より正確な判定が可能となる。

$$\delta n = \frac{1}{100} \times U_{ORG}$$

ここで、U<sub>ORG</sub>は図14においてR、G、B座標軸を32区分した、立方体を単位体積とする数値である。

【0033】1の値は、特定原稿が、原稿台に置かれている場合、約半分まで読み取った時、判定信号MK<sub>n</sub>が1となる様、設定する。

【0034】CCL281は、色空間マッチング処理を

$$ls \geq lm \geq \frac{ls}{2}$$

ls：特定原稿の長手方向のサイズ

lm：CCL281が1である区間距離

【0036】セクタ271、272は、副走査区間信号VS112が0（LOW）のとき、または、色空間マッチング処理領域信号281が0（LOW）のとき、SRAM209を0にクリアするためのものである。アドレスジェネレータ270は、SRAM209のすべてのアドレスを順々に発生する回路である。VSCL280がLOWの時、アドレスジェネレータ270が発生するアドレス信号に従ってSRAM209が0にクリアされる。

【0037】205は、図4に示す、タイミング信号を発生するタイミング発生回路である。

【0038】CLK4206は、基本クロックCLK110を4分周した、クロック信号であり、207は、SRAM209のライトイネーブル端子を制御する信号であり、208はSRAM209のアウトプットイネー

【0027】色空間判定回路240～247において、図14に示すR、G、B色空間における、特定画像データと入力カラー信号の類似度をリアルタイムで算出し、色空間類似度判定信号MK<sub>0260</sub>～MK<sub>7267</sub>を算出する。

【0028】図3は、色空間判定回路240～247の内1つの回路ブロック図である。

【0029】本回路構成により、SRAM209からのデータD<sub>n</sub>と、平滑回路からの信号C<sub>n</sub>と、OR演算され、SRAM209に書き込まれる。また、データD<sub>n</sub>が0から1に還移する場合のみ、カウンタ301がカウンタアップされる。カウンタ301は、副走査区間信号VS112の立ち上がり、または、CCL281のロー区間でクリアされる。

【0030】回路ブロック310は、カウンタ301の出力値の最大値をラッチする回路である。

【0031】カウンタ301の出力最大値Z<sub>n</sub>とレジスタ302の定数δ<sub>n</sub>とがコンパレータ302で大小比較され、Z<sub>n</sub>>δ<sub>n</sub>の場合、MK<sub>n</sub>=1となり、Z<sub>n</sub>≤δ<sub>n</sub>の場合、MK<sub>n</sub>=0となる。δ<sub>n</sub>の値は、図14のU<sub>ORG</sub>の1%の値が設定されている。

【0032】

【外1】

… (1)

行う領域を示す信号であり、図15に示すタイミングで、下記(2)式を満足する様にタイミング発生回路205により発生される。

【0035】

【外2】

… (2)

ブル端子を制御する信号である。

【0039】上記処理により、一定区間領域の観測画像データすなわち、一定区間領域内の入力カラー信号列のデータが、特定原稿の画像データとR、G、B3次元色空間で、ほぼ同一の形状となった時、色空間類似度判定信号MK<sub>0260</sub>～MK<sub>7267</sub>が1に設定される。

【0040】(リアルタイム補正信号生成)図5は、リアルタイム補正信号生成回路107を説明する、回路ブロック図である。

【0041】本回路構成により、ROM204に登録した複数の特定原稿データのうち、いずれか1つでも、観測画像データと色空間上で合致したと判定される時、リアルタイム補正信号f113は1（HIGH）に設定される。

【0042】(プリント信号生成回路)図6は、プリント信号生成回路105を説明する、回路ブロック図である。

【0043】マスキングUCR演算回路A601は、通常時、入力RGB信号より、プリントYMCBk信号を生成する回路である。

【0044】マスキングUCR演算回路B602は、入力カラー信号が特定原稿に合致すると判定された場合、色味を変えた、(例えば、赤みを強く)プリントYMCBk信号を生成する回路である。

【0045】セレクトA603で、リアルタイム補正信号f113により、回路601、602の信号を選択して出力することにより、特定原稿に合致していると判定された領域のみ、色味を変えてプリントすることが可能となる。

【0046】(他の実施例)図20、図21は本発明の第2の実施例を説明するための図面である。

【0047】前記第1の実施例は、一定区間領域毎に、入力原稿と、特定原稿の色分布の類似度を算出するものであった。色分布の類似度の算出値が一定間隔(図15の斜線の区間)で、一旦クリアされるため、特定原稿の置かれている位置によっては、特定原稿検出がうまく行かない可能性がある。

【0048】本第2の実施例においては、上述と同様の構成の2つの判定回路部2001、2002を設け、図21で示す様に、位相の異なる、信号2101(CCL1)、2102(CCL2)により、それぞれの判定回路で、色空間マッチング判定を行うことにより、特定原稿の原稿台上的位置にかかわらず、より正確に特定原稿検出を行うものである。

【0049】本実施例によれば、複数の回路を、異なる位相で働かせるので、簡単な信号制御で、正確な判定が可能となる。

【0050】なお、上記実施例では、副走査方向で領域分割を行う様に、判定データのリセットを行ったが、例えば、コンピュータのソフトウェアにより判定する場合には、例えば、主走査方向に領域分割を行ってもよく、領域の分割の方法は、上述の例に限らない。

【0051】

【発明の効果】以上説明した様に、入力画像の区分された領域毎に、特定画像との類似度を判定することにより、より正確に、特定画像の検出を行うことが可能となる。

【図面の簡単な説明】

【図1】カラー画像読み取り装置の信号処理ブロック図。

【図2】色空間マッチング判定106を説明する図面。

【図3】色空間判定回路240~247を説明する図面。

【図4】SRAM209へのデータ読み取り、書き込みに関するタイミングチャート。

【図5】リアルタイム補正信号生成回路107を説明する回路ブロック図。

【図6】プリント信号生成回路105を説明する回路ブロック図。

【図7】平滑回路220~227の回路構成を示すブロック図。

【図8】入力Xiと平滑演算値Yiとの関係を示す図。

【図9】特定原稿の色空間における形状と判定ROM204の関係を示した図。

【図10】原稿台上の特定原稿の位置と認識領域の関係を示した図。

【図11】特定原稿AのR、G、B3次元色空間での分布を示した図。

【図12】特定原稿BのR、G、B3次元色空間での分布を示した図。

【図13】特定原稿A~Hの色味情報が格納されたROM204の、データ構成を説明した図。

【図14】特定画像データと入力画像データとの比較を概念的に示した図。

【図15】色空間マッチング処理領域信号CCL281と、原稿台上の区分された領域との関係を示した図。

【図16】色空間判定回路240~247を説明する図。

【図17】色空間マッチング判定106を説明する図。

【図18】入力原稿の色分布を示した図。

【図19】第1の実施例で区分される入力領域を示した図。

【図20】第2の実施例の色空間マッチング判定106を説明する図。

【図21】第2の実施例での区分される領域を説明した図。

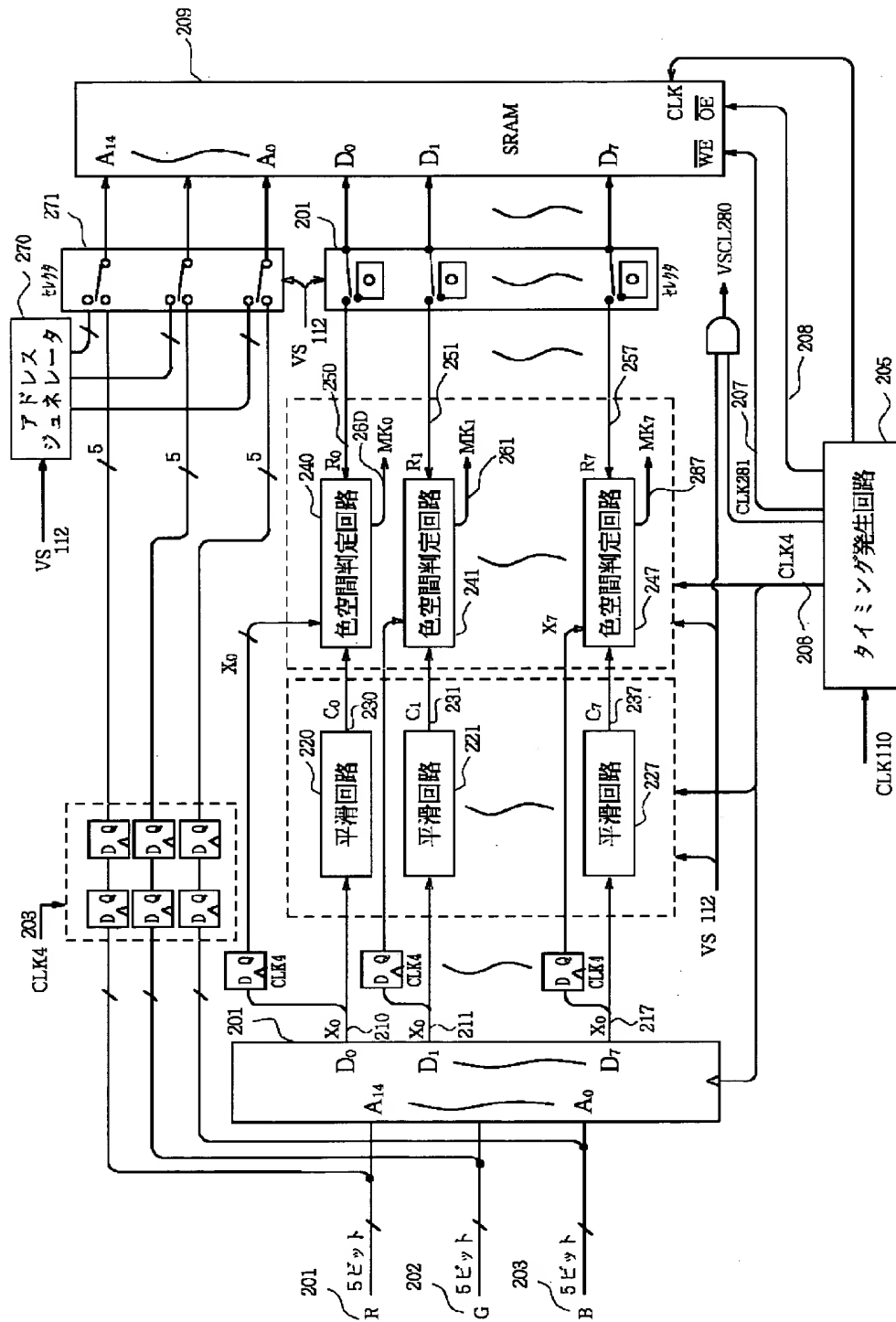
【符号の説明】

106 色空間マッチング判定回路

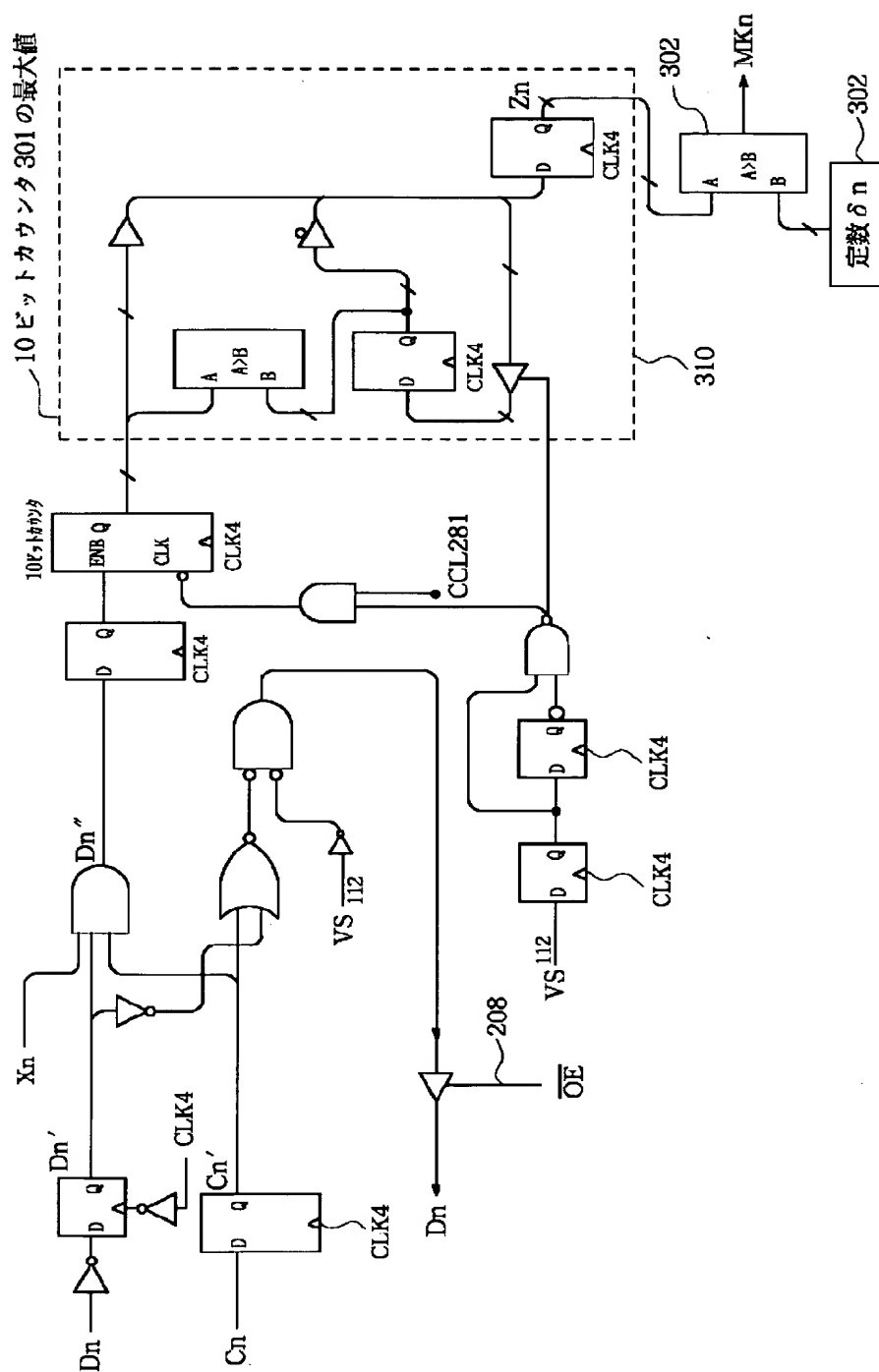
107 リアルタイム補正信号生成回路

[illegible]

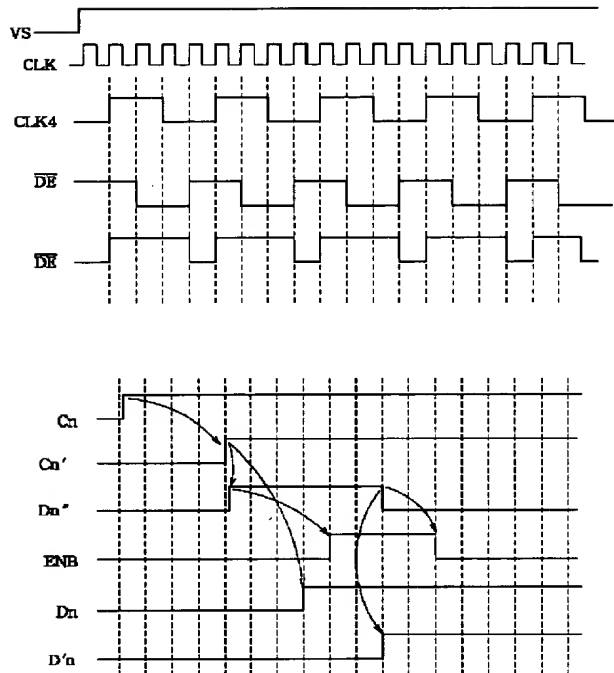
【図2】



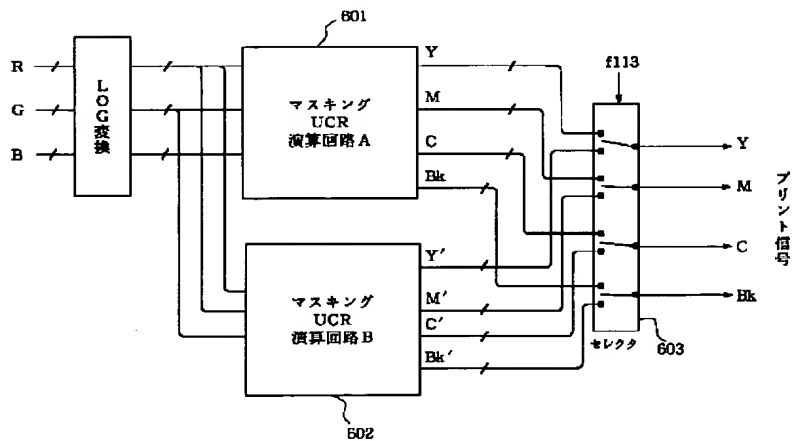
【図 3】



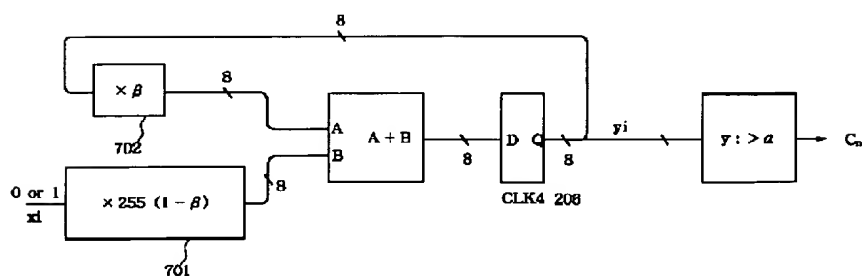
【図4】



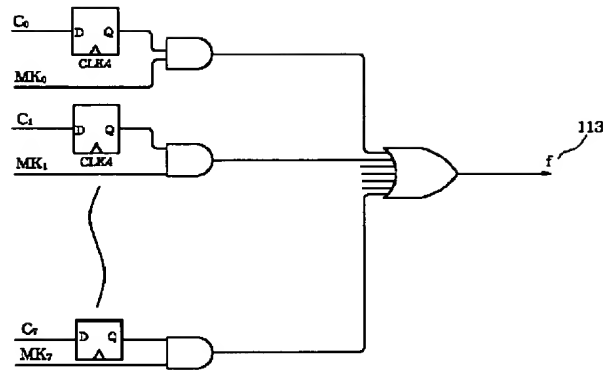
【図6】



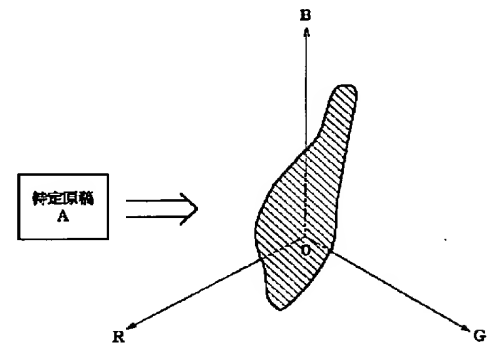
【図7】



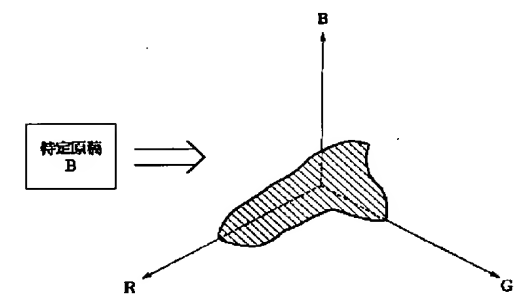
【図5】



【図11】

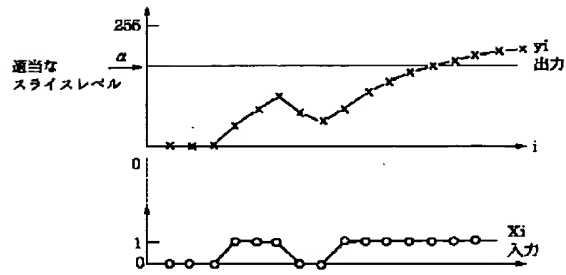


【図12】

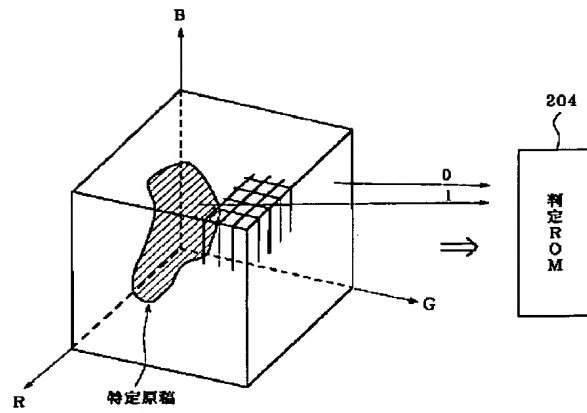




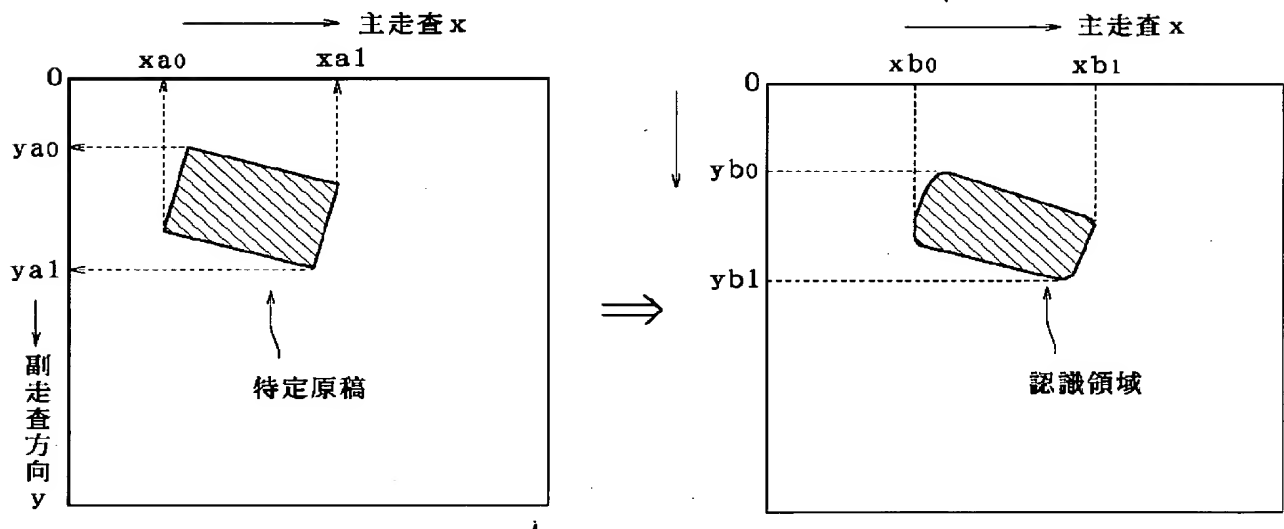
【図8】



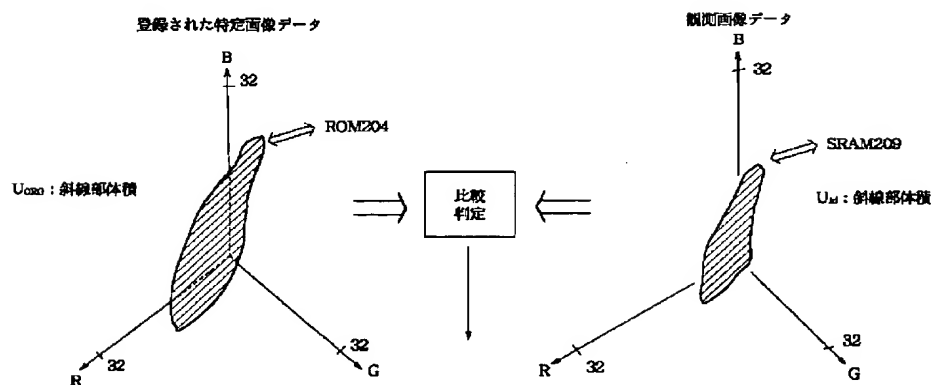
【図9】



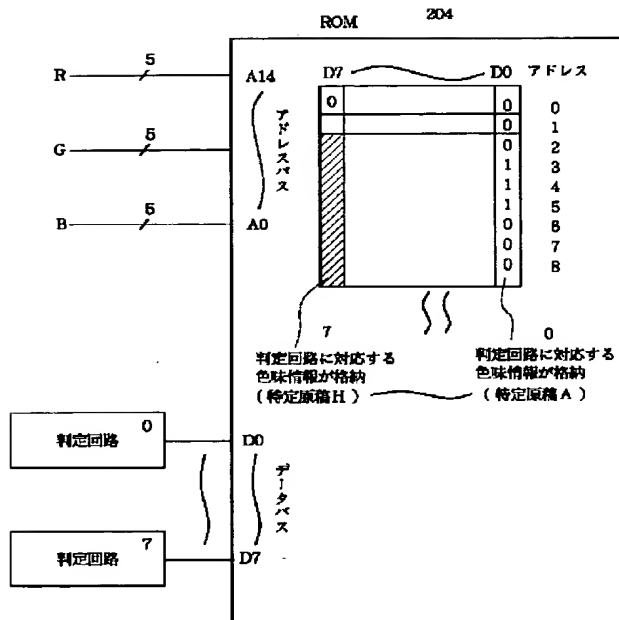
【図10】



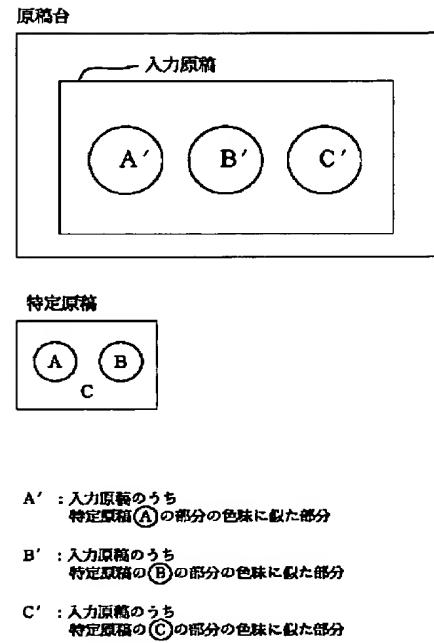
【図14】



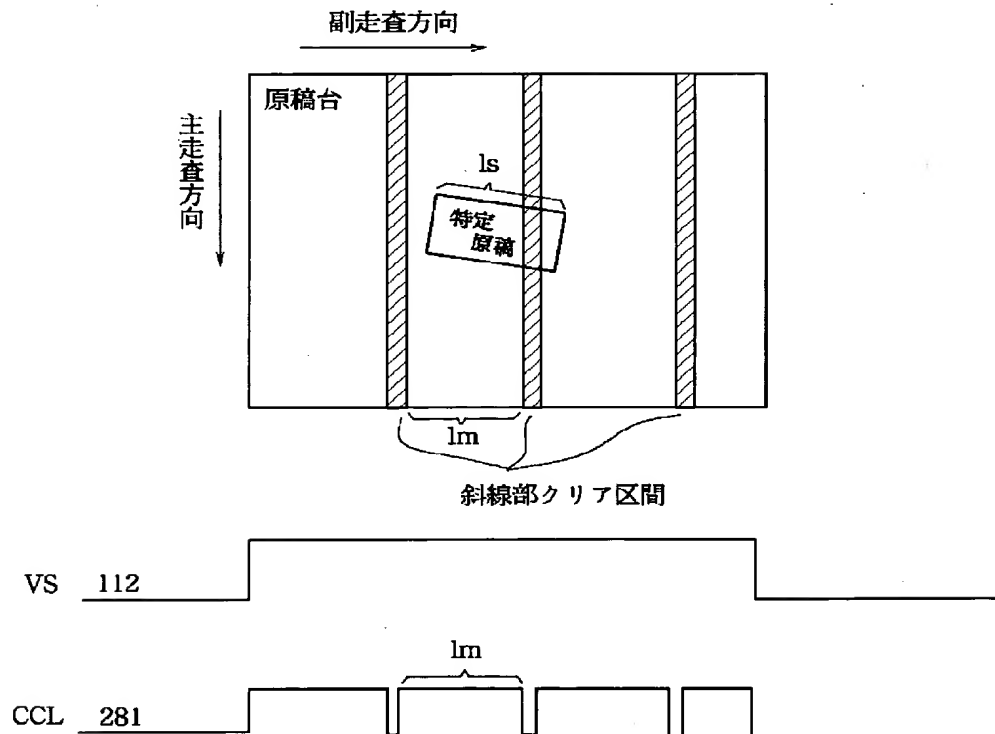
【図13】



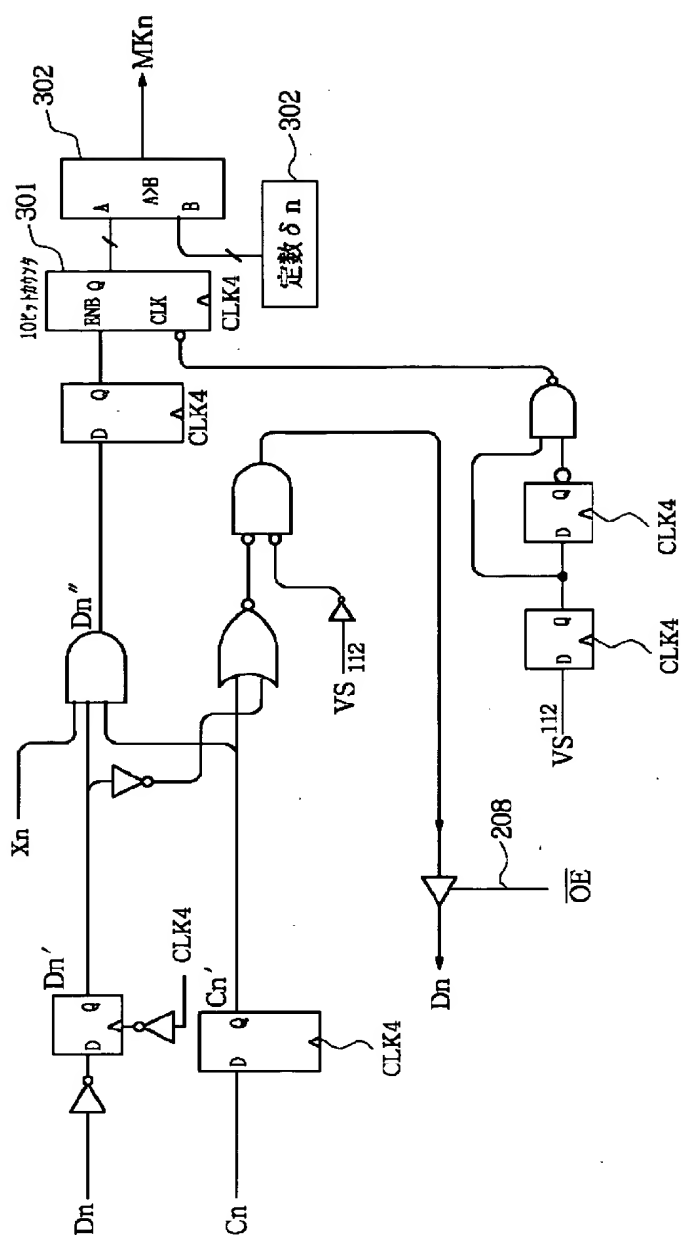
【図18】



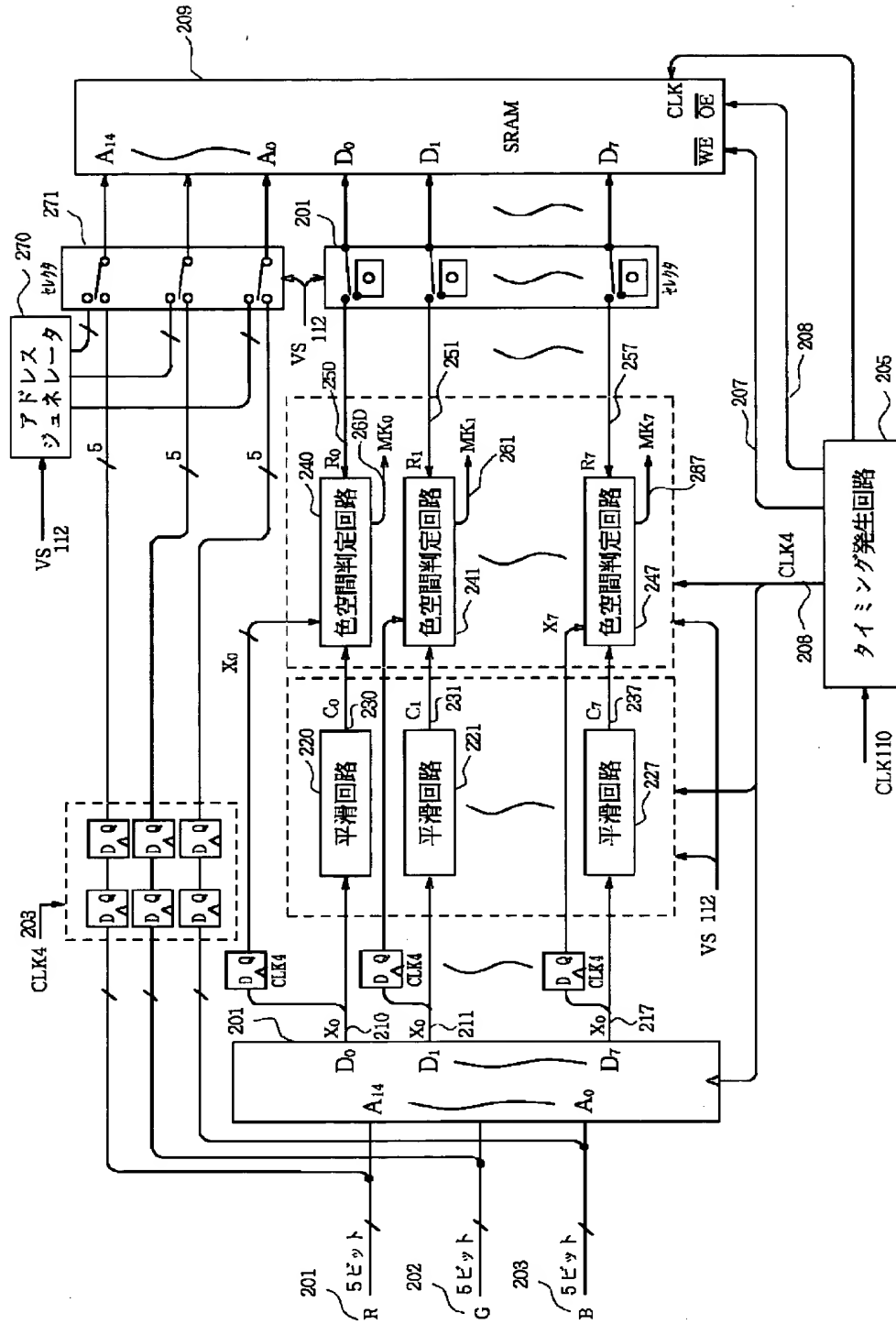
【図15】



【図 16】

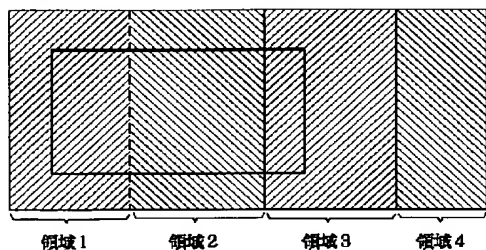


【図17】

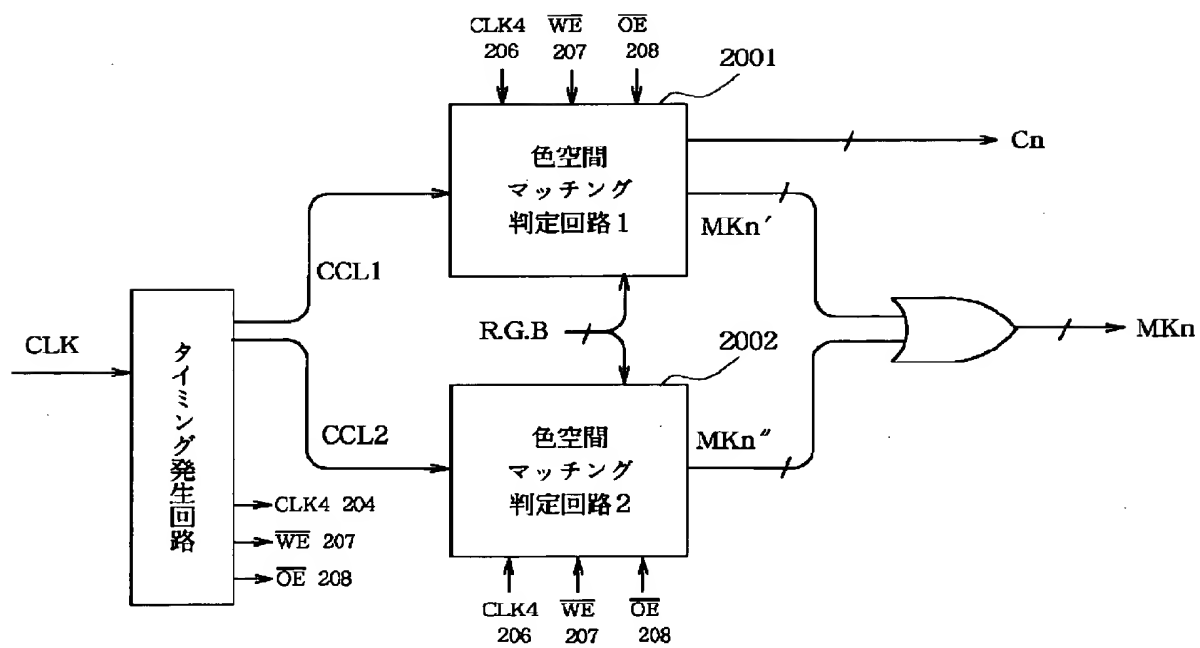


【図19】

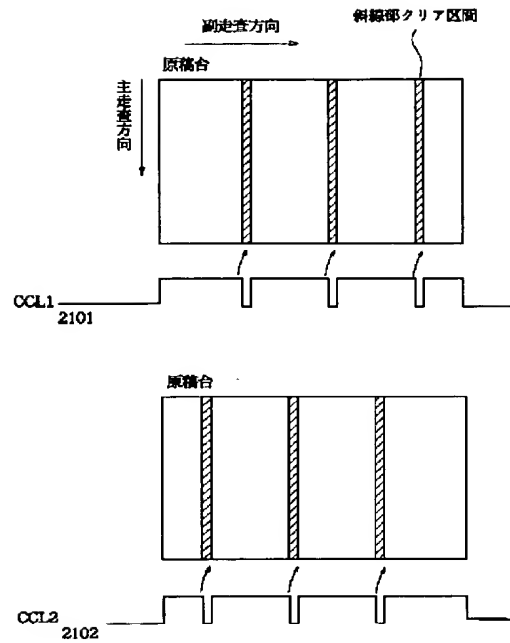
原稿台



【図20】



【図21】



フロントページの続き

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**CLAIMS**

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[Claim(s)]

[Claim 1] The image processing system which is an image processing system which has a means to judge the similarity of an input image and a specific image, and is characterized by judging similarity with a specific image for every predetermined field of said input image.

[Claim 2] Said judgment means is an image processing system according to claim 1 characterized by judging similarity according to distribution of the tint of an input image and a specific image.

[Claim 3] Said specific image is an image processing system according to claim 1 characterized by being two or more images.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the image processing system which performs detection of a specific image based on an input picture signal.

[0002]

[Description of the Prior Art] In recent years, the repeatability of the read manuscript is improving with development of a copying machine. For this reason, the technique for preventing forged acts, such as a bill, is needed. As one of the technique of the, the specific manuscript data in a color space are registered beforehand, distribution of input subject-copy image data judges whether it becomes almost the same as that of distribution of specific manuscript data on a color space, and the technique which distinguishes a specific manuscript is proposed by these people.

[0003] When it becomes more than the constant value which compares distribution in R (red) of input subject-copy image data, G (Green), R of B (blue) signal, G, and B three-dimension coordinate space with distribution in R of specific manuscript data, G, and B three-dimension coordinate space, and has the part which has agreed in more detail, it is judged that the image data of a specific manuscript is inputted.

[0004]

[Problem(s) to be Solved by the Invention] However, according to the above-mentioned technique, as shown, for example in drawing 18, the area of an input manuscript is large, and when the parts similar to the tint of a specific manuscript are scattered, there is a problem of carrying out the misjudgment law of the input manuscript to a specific manuscript accidentally.



[0005] This becomes remarkable as the area of the input manuscript used as the object for a judgment becomes large relatively to a specific manuscript.

[0006] Then, this invention aims at offering the image processing system which prevented the incorrect judging by performing the above-mentioned judgment for every predetermined field of an input image.

[0007]

[Means for Solving the Problem and its Function] In order to solve the above-mentioned technical problem, the image processing system of this invention is an image processing system which has a means to judge the similarity of an input image and a specific image, and is characterized by judging similarity with a specific image for every predetermined field of said input image.

[0008]

[Example] Hereafter, an example explains the example of this invention.

[0009] (Signal-processing block diagram) Drawing 1 is the signal-processing block diagram of a color picture reader.

[0010] In this drawing, 101 is a CCD color sensor, 102 is an analog amplifier, 103 is an A/D converter and 104 is a shading compensation circuit by the reading location of a picture signal which amends dispersion in brightness.

[0011] 106 is a color space matching judging circuit which computes the similarity of distribution in the three-dimension color space of reading image data and specific manuscripts, such as a bill and negotiable securities, on real time.

[0012] By using the color signal after a shading compensation, a similarity judging in a color space can be performed to accuracy irrespective of the location by the location of a manuscript on which distortion of brightness and a tint is amended and an input manuscript is put.

[0013] The shading compensation circuit 104 of a color picture reader is not explained in full detail here for a well-known technique.

[0014] 105 is a print signal generation circuit and is a circuit which changes the input color signals R (red), G (Green), and B (blue) into Y (yellow), M (MAZENDA), C (cyanogen), and Bk (black) signal. Moreover, a print signal is modulated with the real-time amendment signal f113.

[0015] 107 is a circuit which generates the real-time amendment signal f113.

[0016] 108 is a circuit block which generates the reading synchronizing signals IIS109, CLK110, and VS112. IIS109 is a horizontal-scanning

section signal, CLK110 is a pixel reading basic clock signal, and VS112 is a section signal which shows the direction service area of vertical scanning of manuscript reading.

[0017] (Color space matching judging circuit block 106) Drawing 2 is a drawing explaining the color space matching judging 106.

[0018] In this drawing, R201 is data of 5 bits of high orders of the 8 bits of the R (red) signals from the shoe DINGU amendment circuit 104. Similarly, G202 is 5-bit G (Green) signal, and B203 is 5-bit B (blue) signal.

[0019] 204 is ROM (read-only memory) in which the information about the tint of two or more kinds of specific manuscripts is stored. Said R and G, and B signal are inputted into the addresses A0-A14, and the judgment signal which shows whether Inputs R and G and B signal have agreed in each tint of two or more kinds of specific manuscripts is outputted to data D0-D7.

[0020] As shown in the data of ROM204 at drawing 9, the information about the tint of a specific manuscript is stored, and when agreeing in the tint of a specific manuscript and 1 is not so, 0 is outputted to each of D0-D7. D0-D7 correspond to eight kinds of specific manuscripts from the 0th to the 7th.

[0021] Drawing 13 is drawing having shown the relation between the data about the tint of two or more manuscripts stored in ROM204, and the bit position of ROM24. Thereby, the judgment information about the tint of D0-Dseven to eight kinds of different specific manuscripts is outputted to juxtaposition to the inputted pixel data.

[0022] 220-227 are circuits which perform the smooth operation shown by drawing 7 and drawing 8 using the signal of the tint judging signals X0210-X7217.

[0023] Drawing 7 is the circuit block diagram showing the circuitry of smoothing circuits 220-227.

[0024] For 701 and 702, as for an adder and 704, in this drawing, a multiplier and 703 are [ a latch circuit and 705 ] comparators. The judgment which considered the continuity as shown in lower drawing 8 R> 8 with a weighted average with the input data based on multipliers 701 and 702 and an adder 703 and before data is attained.

[0025] Drawing 8 is drawing showing relation with the smooth operation value Yi with Input Xi. If 1 continues [ the value of Input Xi ], the value of Yi will increase.

[0026] A more exact judgment is attained without setting signals 230-237 to 1, and being influenced of a noise etc. by this, when Inputs R and

G and B signal have agreed in the tint of a specific manuscript continuously.

[0027] In the color space judging circuits 240-247, the similarity of the specific image data in R and G which are shown in drawing 14, and B color space, and an input color signal is computed on real time, and the color space similarity judging signals MK0260-MK7267 are computed.

[0028] Drawing 3 is one circuit block diagram among the color space judging circuits 240-247.

[0029] An OR operation is carried out to the data Dn from SRAM209, and the signal Cn from a smoothing circuit by this circuitry, and it is written in SRAM209. Moreover, only when Data Dn \*\*\*\* to 0 to 1, a counter 301 counts up. A counter 301 is cleared in the standup of the vertical-scanning section signal VS 112, or the low section of CCL281.

[0030] The circuit block 310 is a circuit which latches the maximum of the output value of a counter 301.

[0031] A size comparison is carried out with a comparator 302, and in  $Z_n > \Delta n$ , the output maximum  $Z_n$  of a counter 301 and constant  $\Delta n$  of a register 302 are set to  $MKn=1$ , and, in  $Z_n \leq \Delta n$ , are set to  $MKn=0$ . As for the value of  $\Delta n$ , 1% of value of UORG of drawing 14 is set up.

[0032]

[External Character 1]

$$\delta n = \frac{1}{100} \times U_{ORG} \quad \dots (1)$$

Here, UORG is a numeric value which classified R, G, and B axis of coordinates 32 times in drawing 14 and which makes a cube unit volume.

[0033] When the specific manuscript is put on the manuscript base and it reads to abbreviation one half, the value of l is set up so that the judgment signal MKn may be set to 1.

[0034] CCL281 is a signal which shows the field which performs color space matching processing, is the timing shown in drawing 15, and it is generated by the timing generating circuit 205 so that following the (2) type may be satisfied.

[0035]

[External Character 2]

$$l_s \geq l_m \geq \frac{l_s}{2} \quad \dots (2)$$

l<sub>s</sub>: The block distance whose size l<sub>m</sub>:CCL281 of the longitudinal direction

of a specific manuscript is 1 [0036] Selectors 271 and 272 are for clearing SRAM209 to 0, when the vertical-scanning section signal VS 112 is 0 (LOW), or when the color space matching processing field signal 281 is 0 (LOW). An address generator 270 is a circuit which generates all the addresses of SRAM209 one by one. When VSCL280 is LOW, SRAM209 is cleared by 0 according to the address signal which an address generator 270 generates.

[0037] 205 is a timing generating circuit which is shown in drawing 4 and which generates a timing signal.

[0038] CLK4 206 is the clock signal which carried out 4 dividing of the basic clock CLK110, 207 is a signal which controls the write enable terminal of SRAM209, and 208 is a signal which controls the output enable terminal of SRAM209.

[0039] When the observation image data of a fixed section field, i.e., the data of the input color signal train in a fixed section field, becomes the image data of a specific manuscript, and the configuration almost same in R, G, and B three-dimension color space by the above-mentioned processing, the color space similarity judging signals MK0260-MK7267 are set as 1.

[0040] (Real-time amendment signal generation) Drawing 5 is a circuit block diagram explaining the real-time amendment signal generation circuit 107.

[0041] When judged with at least one of two or more specific manuscript data registered into ROM204 having agreed on observation image data and a color space by this circuitry, the real-time amendment signal f113 is set as 1 (HIGH).

[0042] (Print signal generation circuit) Drawing 6 is a circuit block diagram explaining the print signal generation circuit 105.

[0043] The masking UCR arithmetic circuit A601 is a circuit which generates a print YMCBk signal from an input RGB code at the time of usual.

[0044] The masking UCR arithmetic circuit B602 is a circuit which changed the tint and which generates a print (it is about redness) YMCBk signal, when judged with an input color signal agreeing in a specific manuscript.

[0045] It enables only the field judged that has agreed in the specific manuscript to change and print a tint by choosing and outputting the signal of circuits 601 and 602 with the real-time amendment signal f113 by the selector 603.

[0046] (Other examples) Drawing 20 and drawing 21 are the drawings for

explaining the 2nd example of this invention.

[0047] Said 1st example was what computes the similarity of color distribution of an input manuscript and a specific manuscript to every fixed section field. Since the calculation value of the similarity of color distribution is once cleared at fixed spacing (section of the slash of drawing 15 ), depending on the location on which the specific manuscript is put, specific manuscript detection may not go well.

[0048] In the example of \*\*\*\* 2, as formed the two judgment circuit sections 2001 and 2002 of the same configuration as \*\*\*\* and shown in drawing 2121 , with the signals 2101 (CCL1) and 2102 (CCL2) with which phases differ, it is each judgment circuit and specific manuscript detection is performed more to accuracy irrespective of the location on the manuscript base of a specific manuscript by performing a color space matching judging.

[0049] Since two or more circuits are used with a different phase according to this example, an exact judgment is attained by the easy signal control.

[0050] In addition, in the above-mentioned example, judgment data were reset so that field division might be performed in the direction of vertical scanning, but in judging with the software of a computer, field division may be performed to a main scanning direction, and it does not restrict the approach of division of a field to an above-mentioned example, for example.

[0051]

[Effect of the Invention] It becomes possible more to detect a specific image to accuracy by [ which were explained above / into which the input image was classified like ] judging similarity with a specific image for every field.

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**TECHNICAL FIELD**

---

[Industrial Application] This invention relates to the image processing system which performs detection of a specific image based on an input picture signal.

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PRIOR ART

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[Description of the Prior Art] In recent years, the repeatability of the read manuscript is improving with development of a copying machine. For this reason, the technique for preventing forged acts, such as a bill, is needed. As one of the technique of the, the specific manuscript data in a color space are registered beforehand, distribution of input subject-copy image data judges whether it becomes almost the same as that of distribution of specific manuscript data on a color space, and the technique which distinguishes a specific manuscript is proposed by these people.

[0003] When it becomes more than the constant value which compares distribution in R (red) of input subject-copy image data, G (Green), R of B (blue) signal, G, and B three-dimension coordinate space with distribution in R of specific manuscript data, G, and B three-dimension coordinate space, and has the part which has agreed in more detail, it is judged that the image data of a specific manuscript is inputted.

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**EFFECT OF THE INVENTION**

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[Effect of the Invention] It becomes possible more to detect a specific image to accuracy by [ which were explained above / into which the input image was classified like ] judging similarity with a specific image for every field.

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**TECHNICAL PROBLEM**

---

[Problem(s) to be Solved by the Invention] However, according to the above-mentioned technique, as shown, for example in drawing 18 , the area of an input manuscript is large, and when the parts similar to the tint of a specific manuscript are scattered, there is a problem of carrying out the misjudgment law of the input manuscript to a specific manuscript accidentally.

[0005] This becomes remarkable as the area of the input manuscript used as the object for a judgment becomes large relatively to a specific manuscript.

[0006] Then, this invention aims at offering the image processing system which prevented the incorrect judging by performing the above-mentioned judgment for every predetermined field of an input image.

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## OPERATION

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[Means for Solving the Problem and its Function] In order to solve the above-mentioned technical problem, the image processing system of this invention is an image processing system which has a means to judge the similarity of an input image and a specific image, and is characterized by judging similarity with a specific image for every predetermined field of said input image.

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## EXAMPLE

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[Example] Hereafter, an example explains the example of this invention.

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[0013] The shading compensation circuit 104 of a color picture reader is not explained in full detail here for a well-known technique.

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[0017] (Color space matching judging circuit block 106) Drawing 2 is a drawing explaining the color space matching judging 106.

[0018] In this drawing, R201 is data of 5 bits of high orders of the 8 bits of the R (red) signals from the shoe DINGU amendment circuit 104. Similarly, G202 is 5-bit G (Green) signal, and B203 is 5-bit B (blue) signal.

[0019] 204 is ROM (read-only memory) in which the information about the tint of two or more kinds of specific manuscripts is stored. Said R and G, and B signal are inputted into the addresses A0-A14, and the judgment signal which shows whether Inputs R and G and B signal have agreed in each tint of two or more kinds of specific manuscripts is outputted to data D0-D7.

[0020] As shown in the data of ROM204 at drawing 9, the information about the tint of a specific manuscript is stored, and when agreeing in the tint of a specific manuscript and 1 is not so, 0 is outputted to each of D0-D7. D0-D7 correspond to eight kinds of specific manuscripts from the 0th to the 7th.

[0021] Drawing 13 is drawing having shown the relation between the data about the tint of two or more manuscripts stored in ROM204, and the bit position of ROM24. Thereby, the judgment information about the tint of D0-Dseven to eight kinds of different specific manuscripts is outputted to juxtaposition to the inputted pixel data.

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[0024] For 701 and 702, as for an adder and 704, in this drawing, a multiplier and 703 are [ a latch circuit and 705 ] comparators. The judgment which considered the continuity as shown in lower drawing 8  $R > 8$  with a weighted average with the input data based on multipliers 701 and 702 and an adder 703 and before data is attained.

[0025] Drawing 8 is drawing showing relation with the smooth operation value  $Y_i$  with Input  $X_i$ . If 1 continues [ the value of Input  $X_i$  ], the value of  $Y_i$  will increase.

[0026] A more exact judgment is attained without setting signals 230-237 to 1, and being influenced of a noise etc. by this, when Inputs R and G and B signal have agreed in the tint of a specific manuscript continuously.

[0027] In the color space judging circuits 240-247, the similarity of the specific image data in R and G which are shown in drawing 14 , and B color space, and an input color signal is computed on real time, and the color space similarity judging signals MK0260-MK7267 are computed.

[0028] Drawing 3 is one circuit block diagram among the color space judging circuits 240-247.

[0029] An OR operation is carried out to the data Dn from SRAM209, and the signal Cn from a smoothing circuit by this circuitry, and it is written in SRAM209. Moreover, only when Data Dn \*\*\*\* to 0 to 1, a counter 301 counts up. A counter 301 is cleared in the standup of the vertical-scanning section signal VS 112, or the low section of CCL281.

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[0032]

[External Character 1]

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[0035]

[External Character 2]

$$l_s \geq l_m \geq \frac{l_s}{2} \quad \dots (2)$$

$l_s$ : The block distance whose size  $l_m$ :CCL281 of the longitudinal direction of a specific manuscript is 1 [0036] Selectors 271 and 272 are for clearing SRAM209 to 0, when the vertical-scanning section signal VS

112 is 0 (LOW), or when the color space matching processing field signal 281 is 0 (LOW). An address generator 270 is a circuit which generates all the addresses of SRAM209 one by one. When VSCL280 is LOW, SRAM209 is cleared by 0 according to the address signal which an address generator 270 generates.

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[0041] When judged with at least one of two or more specific manuscript data registered into ROM204 having agreed on observation image data and a color space by this circuitry, the real-time amendment signal f113 is set as 1 (HIGH).

[0042] (Print signal generation circuit) Drawing 6 is a circuit block diagram explaining the print signal generation circuit 105.

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[0044] The masking UCR arithmetic circuit B602 is a circuit which changed the tint and which generates a print (it is about redness) YMCBk signal, when judged with an input color signal agreeing in a specific manuscript.

[0045] It enables only the field judged that has agreed in the specific manuscript to change and print a tint by choosing and outputting the signal of circuits 601 and 602 with the real-time amendment signal f113 by the selector 603.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The signal-processing block diagram of a color picture reader.

[Drawing 2] The drawing explaining the color space matching judging 106.

[Drawing 3] The drawing explaining the color space judging circuits 240-247.

[Drawing 4] The timing chart about data reading by SRAM209, and writing.

[Drawing 5] The circuit block diagram explaining the real-time amendment signal generation circuit 107.

[Drawing 6] The circuit block diagram explaining the print signal generation circuit 105.

[Drawing 7] The block diagram showing the circuitry of smoothing circuits 220-227.

[Drawing 8] Drawing showing the relation between Input  $X_i$  and the smooth operation value  $Y_i$ .

[Drawing 9] Drawing having shown the configuration in the color space of a specific manuscript, and the relation of judgment ROM 204.

[Drawing 10] Drawing having shown the location of the specific manuscript on a manuscript base, and the relation of a recognition field.

[Drawing 11] Drawing having shown distribution in R of the specific manuscript A, G, and B three-dimension color space.

[Drawing 12] Drawing having shown distribution in R of the specific manuscript B, G, and B three-dimension color space.

[Drawing 13] Drawing explaining the data configuration of ROM204 in which the tint information on specific manuscript A-H was stored.

[Drawing 14] Drawing having shown notionally the comparison with

specific image data and input image data.

[Drawing 15] Drawing having shown the relation between the color space matching processing field signal CCL 281 and the field where it was classified on the manuscript base.

[Drawing 16] Drawing explaining the color space judging circuits 240-247.

[Drawing 17] Drawing explaining the color space matching judging 106.

[Drawing 18] Drawing having shown color distribution of an input manuscript.

[Drawing 19] Drawing having shown the input area classified in the 1st example.

[Drawing 20] Drawing explaining the color space matching judging 106 of the 2nd example.

[Drawing 21] Drawing explaining the field in the 2nd example classified.

[Description of Notations]

106 Color Space Matching Judging Circuit

107 Real-time Amendment Signal Generation Circuit

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[Translation done.]